Identifying Adverse Drug Events: Development of a Computerized Monitor, and Comparison to Chart Review

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ABSTRACT

We developed an adverse drug event (ADE) monitor based on published rules, made modifications to improve its sensitivity and positive predictive value, and compared it to manual chart review and self report. Over the study period, the ADE monitor (COMP) identified 279 ADEs while the manual chart review and self-report mechanism (CHART) identified 421; 79 cases overlapped. Cases identified by COMP were more likely to be severe (p=0.03) but were similarly preventable (P=0.10). Changes in the knowledge base substantially improved the sensitivity and positive predictive value of the rules.

INTRODUCTION

Adverse drug events are both common and costly[1]. Most hospitals identify ADEs using spontaneous reporting, but this is insensitive; chart review identifies more events but is very costly. To develop a strategy which could routinely be used to identify and measure the frequency of ADEs, we developed a computerized ADE monitor, and evaluated it in a prospective cohort study in one tertiary care hospital. Others have developed such monitors[2] and we used their published reports in developing our knowledge base. However, comparisons between computerized monitors and an independent chart review identification approach have not been reported to our knowledge.

METHODS

We used a program called an event monitor to look for incidents suggesting the presence of an ADE. A trained reviewer then performed chart review to evaluate each incident. We used the results to compare the computerized monitoring strategy (COMP) with the combination of chart review and self report (CHART). These reviews were blinded and independent. We also evaluated the positive predictive value of the monitor-generated incidents initially and after modifications to the knowledge base. Finally, we compared the intensity of resources used by both methods in identifying ADEs.

RESULTS

COMP identified 2620 incidents and 279 ADEs, while CHART identified 421 ADEs. Together, they identified 621 ADEs of which 79 were detected by both methods. COMP identified 45% while CHART identified 68% of the total ADEs. COMP ADEs were more often severe (51% vs 43%, p=0.03) than CHART ADEs but the two methods were comparably preventable (22% vs 28%, p=0.10). CHART identified 96 potential ADEs, while COMP identified two.

The positive predictive value of the computer-identified incidents varied substantially but averaged 13% at the beginning of the study. Rule modifications allowed us to increase the positive predictive value to 20% in the final two months of the study period.

COMP used a mean of 11 person-hours/week to generate the list of incidents and conduct a targeted chart review while CHART required a mean of 60 person-hours/week.

DISCUSSION

We conclude that the computerized monitor was almost as effective as the chart review strategy for identifying ADEs and was much less expensive. However, there was surprisingly little overlap among the ADEs found by the methods, suggesting that the true event rate is higher than that estimated by either alone. Rule refinement substantially improved specificity and further increases will be possible as more coded data become available. Computerized monitors represent an efficient, practical approach for organizations to routinely survey for ADEs.

References

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Acknowledgment: This work was supported in part by the Harvard Risk Management Foundation.

0195—4210/96/$5.00